Accommodations Toolkit

Paper Format: Research

This fact sheet on **paper format** is part of the *Accommodations Toolkit* published by the National Center on Educational Outcomes (NCEO). It summarizes information and research findings on paper format as an accommodation[1]. This toolkit also contains a summary of states' accessibility policies for paper format (/nceo/accommodations-toolkit/paper-format-policies).

What is paper format in an otherwise digital environment? The paper format accommodation is the use of a printed version of a test that is otherwise administered digitally. Either the test can be requested in paper format prior to administration or portions can be printed on demand, allowing students to request a printed version of any passage, stimuli, or question during testing. The use of paper format often requires administrators to follow additional security procedures.

What are the research findings on who should use this accommodation? Students who benefit most from paper format are students with sensory or physical disabilities that affect their vision or ability to interact with a computer, and students who require assistive technology that is incompatible with the testing platform.

What are the research findings on implementation of paper format? Three studies were located that examined issues related to digital versions of an assessment or implementation of paper format as an accommodation.

- Two studies emphasized that variations in digital display features such as screen size, resolution, font size, lines per page, line spacing, and color contrast could potentially affect student performance (Higgins et al., 2005; McLaughlin & Kamei-Hannan, 2018).
- In a study of fourth grade students, Higgins et al. (2005) found that the need to scroll might disadvantage some students, especially those with poor computer skills.
- One study found that students, ages 12 to 17, with significant visual impairments may benefit from the use of electronic tablets, rather than print format, if taught how to adjust font size, style, color, and contrast of the digital display (McLaughlin & Kamei-Hannan, 2018). Students in this study read more words per minute (WPM) with fewer errors using an adjustable electronic tablet as compared to the paper format.
- One study (Lee at al., 2021) looked at the "print on demand" accommodation available for a computer adaptive test. This accommodation allowed students to request a printed version of any item passages, stimuli, or questions during testing. Of the students approved for this accommodation, 28% utilized this option during the English language arts test and 12% used it during mathematics. On average, students requested print versions of two items per test.

What perceptions do students and teachers have about paper format in an otherwise digital environment? No studies were identified that examined teacher perceptions regarding the use of paper format. One research study examined student perceptions about the use of paper format.

- McLaughlin & Kamei-Hannan (2018) found that students preferred accommodations that minimized social stigma over obvious or cumbersome assistive technology devices; and that, depending upon individual student preferences, either the paper format or an assessment administered digitally could help minimize social stigma for teenagers.

What have we learned overall? Findings suggest that for students with disabilities the benefits of completing assessments on paper is dependent on individual characteristics and needs. Students with visual impairments may not need a paper format accommodation if they are familiar with how to adjust digital display settings (e.g., font size, screen resolution, color contrast). In general, paper format might be beneficial for students with very specific needs including those who have difficulty navigating through digital items or using the "scroll" feature to access complete reading passages. However, research found that a majority of students allowed the print on demand option chose not to use it or used it sparingly.

As more assessments are administered digitally, additional research is needed on how the paper format can provide access to assessments for students with disabilities who have various needs and characteristics. Additional research is also needed on the availability of various options such as adjusting digital format settings like font size, lines per

page and color contrast that may reduce the need for the paper option.

Footnotes

[1]

Research on tactile graphics summarized here is also available in NCEO's searchable *Accommodations for Students with Disabilities Bibliography* (https://nceo.info/Resources/bibliographies):://nceo.info/Resources/bibliographies (https://nceo.info/Resources/bibliographies)) and in NCEO syntheses of research from 1999 through 2019 (see summaries for: 1999–2001 (https://nceo.umn.edu/docs/OnlinePubs/TechReport34.pdf), 2002–2004 (https://nceo.umn.edu/docs/OnlinePubs/Tech45/Technical45.pdf), 2005–2006 (https://nceo.umn.edu/docs/OnlinePubs/Tech47/TechReport47.pdf), 2007–2008 (https://nceo.umn.edu/docs/OnlinePubs/Tech56/TechnicalReport56.pdf), 2009–2010 (https://nceo.umn.edu/docs/OnlinePubs/Tech65/TechnicalReport65.pdf), 2011–2012 (https://nceo.umn.edu/docs/OnlinePubs/Synthesis94/Synthesis94.pdf), 2013–2014 (https://nceo.umn.edu/docs/OnlinePubs/Report402/NCEOReport402.pdf), 2015–2016 (https://nceo.umn.edu/docs/OnlinePubs/NCEOReport412.pdf), 2017 (https://nceo.umn.edu/docs/OnlinePubs/NCEOReport418.pdf), 2018 (https://nceo.umn.edu/docs/OnlinePubs/NCEOReport423.pdf), 2019 (https://nceo.umn.edu/docs/OnlinePubs/NCEOReport433.pdf)). See the reports and online bibliography for additional information about the criteria used to identify studies included in this fact sheet.

References

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Ressa, V. A., Lazarus, S. S., Hinkle, A. R., & Fleming, K. (2022). *Paper Format: Research (NCEO Accommodations Toolkit #28a)*. National Center on Educational Outcomes.

The Center is supported through a Cooperative Agreement (#H326G210002) with the Research to Practice Division, Office of Special Education Programs, U.S. Department of Education. The Center is affiliated with the Institute on Community Integration at the College of Education and Human Development, University of Minnesota. Consistent with EDGAR §75.62, the contents of this report were developed under the Cooperative Agreement from the U.S. Department of Education, but do not necessarily represent the policy or opinions of the U.S. Department of Education or Offices within it. Readers should not assume endorsement by the federal government.